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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,783	02/24/2006	Makoto Tanaka	MES1P094	6013

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EXAMINER	
MCCALISTER, WILLIAM M	
ART UNIT	PAPER NUMBER
3753	

NOTIFICATION DATE	DELIVERY MODE
06/24/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTOmail@beyerlaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/569,783	TANAKA ET AL.	
	Examiner	Art Unit	
	WILLIAM MCCALISTER	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3 and 5-25* is/are pending in the application.

4a) Of the above claim(s) *11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5-10 and 12-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/2/2010 has been entered.

2. Claims 2, 4 and 26 have been cancelled. Claim 11 stands withdrawn. Claims 1, 3, 5-10 and 12-26 are pending for immediate consideration.

Claim Objections

3. Claim 7 is objected to because of the following informalities: it is suggested that the semicolon at line 3 be removed, just as the semicolon at line 12 was removed. Appropriate correction is required.

4. Claim 12 is objected to because of the following informalities: it is suggested that the phrase “a first opening and closing valve of opening and closing the channel” (lines 3-4) be replaced with the phrase --a first opening and closing valve for opening and closing the channel--.

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 3, 5, 7, 9, 10, 12-17, and 19-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Ollivier (US 6,450,200).

Regarding claim 1, Ollivier discloses a flow control device (see FIG 1A) for controlling a flow of a fluid in a channel in which the fluid is supplied to a target where a pressure is lower than a fluid supply source, comprising:

a first opening and closing valve (14) for opening and closing the channel;

a flow control component (22) with a flow control valve mechanism which controls the flow of the fluid flowing through the channel by adjusting an aperture of the flow control valve by means of a valve driving signal (inherently, this is how all mass flow controllers (MFCs) operate to control valve position);

an accumulator (5) in which the fluid flowing through the channel can be held between the first opening and closing valve (14) and the flow control mechanism (22);

a pressure detector (6) capable of detecting a pressure of the fluid which flows into or away from the accumulator on a same side as the flow control valve mechanism (of 22) relative to the first opening and closing valve (14); and

a deviation measurement/control component (3) for calculating a deviation of the flow controlled by the flow control component from a standard level (from the “specified, desired flow rate”, col. 6 line 6),

wherein the deviation measurement/control component (3):

fixes an aperture of the flow control valve mechanism (of 22) at a selected aperture opening by fixing the valve driving signal (the inherent valve driving signal must be fixed to achieve the “controlled flow rate”; see col. 5 lines 59-67) and measures changes in the pressure using the pressure detector while the channel is closed by the first opening and closing valve (14) (“the pressure drop … is measured … while interrupting the flow ... with valve 14”; see col. 5 lines 61-65),

wherein the aperture remains fixed at the selected aperture opening during the pressure change measurement (“the pressure drop … is measured … while … continuing to deliver process gas … at the controlled flow rate”, where “the controlled flow rate” implies a fixed aperture size in flow control component 22 because pressure regulator 16 acts to hold constant the pressure of fluid entering member 22), and

calculates the deviation from the standard level associated with the selected aperture opening based on the measured changes in the pressure (Ollivier’s measured pressure change is used to calculate an actual flow rate {col. 6 lines 1-5}, the actual flow rate is compared to the standard level {i.e. – it is compared to the "specified, standard flow rate", col. 6 lines 5-7}, and the standard level is *associated with* the selected aperture opening because the standard level is used to set the setpoint flow rate of the MFC {col. 6 lines 7-10, 12-16}, wherein the setpoint of the MFC determines the aperture opening of the MFC for each iteration) wherein

the flow control component (22) further comprises a flow detector capable of measuring the flow of the fluid flowing through the channel on the same side as the flow control valve relative to the first opening and closing valve (all mass flow controllers contain a flow detector, and the flow which is measured is the same both upstream and downstream of the valve, i.e., the flow rate entering the MFC is the same as that leaving the MFC; note that the double-underlined phrase describes the flow of fluid, not the position of the flow detector), and controls the flow of the fluid flowing through the channel by adjusting the aperture of the flow control valve mechanism based on a target flow (the "setpoint flow rate" of the MFC, col. 6 lines 7-10) and the flow measured by the flow detector (all MFCs measure flow and compare the measured flow to a setpoint flow rate in order to adjust a valve and thereby realize the setpoint flow rate therethrough), and

the deviation measurement/control component (3) is capable of adjusting an output level representing the flow by the flow detector (member 3 sets the setpoint flow rate of MFC 22) based on the deviation from the standard level (see col. 6 lines 1-16).

Regarding claim 3, Ollivier discloses a second opening and closing valve (24) for opening and closing the channel on a side opposite the first opening and closing valve (14) relative to the flow detector (valve 24 is downstream of MFC 22, valve 14 is upstream of MFC 22). Further, the deviation measurement/control component (3) is

capable of reading the output level (of the pressure sensors) representing the flow by the flow detector (the pressure sensors and the MFC's flow detector detect the same flow) while the channel is closed by the first and second opening and closing valves (while no flow occurs), and adjusting an output level representing zero flow by the detector (just as it does when the second valve is open).

Regarding claim 5, Ollivier discloses:

a temperature detector capable of measuring a temperature of the fluid on the same side as the flow control valve mechanism relative to the first opening and closing valve (downstream of the on/off valve 14, see col. 5 lines 30-32), wherein

the deviation measurement/control component further calculates the deviation from the standard level (see col. 5 lines 35-47) based on:

an initial pressure P_0 of the fluid at a first time (inherent to $\Delta P/\Delta t$) in a certain time interval (Δt) including a time the channel is closed by the first opening and closing valve (col. 5 lines 60-63),

an absolute temperature T_1 of the fluid at a second time period in the certain time interval (Δt), and

a time period from a time the pressure of the fluid reaches a certain first standard pressure P_1, after the channel is closed by the first opening and closing valve, until a time the pressure reaches a certain second standard pressure P_2 which is different from the first standard pressure P_1 (inherent to $\Delta P/\Delta t$).

Regarding claim 7, Ollivier discloses a mass flow control device comprising:

a flow control component (MFC 22) which:

has in a channel (1) through which a fluid flows:

a flow detector (inherent to MFC 22) for detecting a mass flow of the fluid that flows through the channel and outputting a flow signal; and

a flow control valve mechanism (inherent to MFC 22) for controlling the mass flow by altering a valve aperture by means of valve drive signals, and

controls the flow control valve mechanism based on an externally input flow set signal (the set point) and the flow signal (the feedback),

wherein the mass flow control device further comprises a deviation measurement/control component which

has in the channel:

a first opening and closing valve (14) for opening and closing the channel;

an accumulator (5) in which the fluid flowing through the channel can be held between the first opening and closing valve (14) and the flow control valve mechanism (of MFC 22); and

a pressure detector (6) for detecting a pressure of the fluid which flows into or flows from the accumulator (5), outputting a pressure detection signal, and

controls (via member 3) the first opening and closing valve and the accumulator and the pressure detector to perform a mass flow test operations (col. 6 lines 1-10), based on

(i) the measured pressure changes measured while the valve aperture remains fixed at the selected aperture opening by fixing the valve drive signals (because pressure regulator 16 acts upstream of MFC 22, the opening of MFC 22 is fixed to maintain the “controlled flow rate”) and

(ii) a predetermined standard pressure change characteristic associated with the selected aperture opening (see generally col. 5 line 54 to col. 6 line 22; the measured pressure change profile is compared to the expected flow rate through the MFC).

Regarding claim 9, see the analysis of claim 3 above.

Regarding claim 10, Ollivier discloses the first opening and closing valve, the accumulator, and the pressure detector to be provided further upstream than the flow detector and the flow control valve mechanism (see FIG 1A).

The method steps of claims 12-17, 19 and 20 would necessarily be performed during the normal and usual operation of Ollivier's device. Regarding claim 19, the verification flow is altered by selection of the aperture opening which occurs in the next iteration of the test procedure (see col. 6 lines 13-22).

Regarding claims 21, 22, 24 and 25, Ollivier's deviation measurement/control component calculates the deviation from the standard level associated with the selected aperture opening based on the measured changes in the pressure (Ollivier's measured pressure change is used to calculate an actual flow rate {col. 6 lines 1-5}, the actual flow rate is compared to the standard level {i.e. – it is compared to the "specified, standard flow rate", col. 6 lines 5-7}, and the standard level is *associated with* the selected aperture opening because the standard level is used to set the setpoint flow rate of the MFC {col. 6 lines 7-10, 12-16}, wherein the setpoint of the MFC determines the aperture opening of the MFC for each iteration), wherein the standard level is obtained (the standard level, or "specified, desired flow rate" is obtained at the output of the MFC since the purpose of the MFC is to achieve its specified, desired flow rate) by a previously conducted process (the following data must be obtained before it can be used in the comparison function) of fixing the aperture of the flow control valve and by

measuring pressure changes in actual flow rate (“the pressure drop … is measured … while interrupting the flow ... with valve 14”; see col. 5 lines 61-65).

Regarding claim 23, Ollivier discloses a temperature detector (see col. 5 lines 30-32) arranged to measure a temperature of the fluid on the same side as the flow control valve mechanism (22) relative to the first opening and closing valve (14), wherein

the deviation measurement/control component calculates the deviation from the standard level based on:

an initial pressure P0 (the initial pressure in the measurement of the drop in pressure as the capacity empties over time) of the fluid at a first time in a certain time interval including a time the channel is closed by the first opening and closing valve (“the pressure drop … is measured … while interrupting the flow ... with valve 14”; see col. 5 lines 61-65),

an absolute temperature T1 of the fluid at a second time period in the certain time interval (see col. 5 line 47, the temperature is in degrees Kelvin), and

a time period Δt from a time the pressure of the fluid reaches a certain first standard pressure P1 after the channel is closed by the first opening and closing valve until a time the pressure reaches a certain second standard pressure P2 which is different from the first standard pressure P1 (Ollivier measures ΔP/Δt; see col. 5 lines 43-46).

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1, 3, 5, 7, 9, 10, 12-17, and 19-25 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier (US 6,450,200) in view of Wilmer (US 5,865,205).

Regarding claims 1 and 7, Ollivier substantially discloses the invention as claimed. However, should it be determined that Ollivier does not inherently disclose the details of the flow control component (22) as claimed, it would have been obvious to one of ordinary skill in the art at the time of invention to use such a MFC to control flow through Ollivier's system. Wilmer teaches that it was known to use such a flow rate controller (MFC: 356, 357, 358, 360, 370, 372, 308, 330, 332, 357, with valve drive signal 310 that can fix the position of valve 356 and actuator 357) to control flow through a similar system. The remaining claim recitations read on this combination as they do on Ollivier alone.

Regarding claim 3, Ollivier discloses a second opening and closing valve (24) for opening and closing the channel on a side opposite the first opening and closing valve (14) relative to the flow detector (it's downstream of the MFC). Further, the deviation measurement/control component (Wilmer's MFC comparator 308) would be capable of reading the output level representing the flow by the flow detector while the channel is

closed by the first and second opening and closing valves (no flow), and adjusting an output level representing zero flow by the detector (since this is the flow that would be detected).

Regarding claims 5, 9 and 10, see the analyses set forth under paragraph 6 above.

The method of claims 12-17, 19 and 20 would necessarily be performed during the normal and usual operation of the Ollivier-Wilmer device.

Regarding claims 21-25, see the corresponding analyses set forth above.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier (and alternatively Ollivier in view of Wilmer) as applied to claim 1 above.

Mathematical derivation of an expression from well known physical relationships, and the use of functional equivalents thereof (including the use of a ratio to indicate a difference), was within the skill of an artisan at the time of invention and it would have been obvious to do so with Ollivier's system to achieve similar results.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier (and alternatively over Ollivier in view of Wilmer) as applied to claim 7 above.

Ollivier discloses the invention as claimed, including that it was known in the art at the time of invention to automatically calibrate a set point based on a result of a test (see col. 6 lines 12-16). Neither Ollivier nor Wilmer teaches the step of calibrating the flow detector. However, an MFC's actuation signal was known to be, by definition, a function of the set point and flow rate measurement only. Calibration of a MFC could therefore be performed in a finite number of ways, i.e. - on either of the two inputs, the output, or a combination thereof. Predictably, since only these three signals affect actuation of the MFC, calibration of one rather than the other would have resulted in calibration of the MFC. It therefore would have been obvious to one of ordinary skill in the art at the time of invention to calibrate the flow rate measurement instead of the set point to predictably achieve the same result of MFC calibration.

11. Claim 18 as understood is rejected under 35 U.S.C. 103(a) as being unpatentable over Ollivier (and alternatively over Ollivier in view of Wilmer) as applied to claim 17 above.

The analysis of claim 8 set forth under paragraph 10 above is incorporated by reference. Normal and usual operation of the resultant device would have necessarily involved the performance of the claimed method step.

Response to Arguments

12. Applicant’s arguments (Remarks of 6/2/2010, pp. 10-11) regarding the new matter rejection of claims 21, 22, 24 and 25 have been fully considered and are persuasive. The rejection of these claims on these grounds has been withdrawn.

13. Applicant's arguments regarding the art, filed 6/2/2010, have been fully considered but they are not persuasive.

a. Applicant argues that Ollivier's pressure sensor is unable to "measure changes in the pressure", because pressure regulator 16 precludes the pressure from changing (Remarks, p. 12). As explained in the previous action, pressure regulators do not necessarily regulate pressure both upstream and downstream pressure. (See for example US 2,736,337 at col. 2 lines 9-18.) Moreover, such a notion stands in contradiction to the clear disclosure that “the pressure drop of the process gas in the reference capacity is measured ...” (col. 5 lines 60-62). Also, if Applicant’s contention were true, there would be no need for pressure sensor (6). There is no reason to presume that Ollivier would include unneeded elements within the system.

b. Applicant argues that in Ollivier’s system, " when the mass flow control valve 22 and pressure regulator 16 are both under control, such as when, the aperture of the mass control valve 22 is not fixed and the pressure regulator 16 affects the pressure of the fluid, then <u>even if the pressure measurement shows that there is a difference between the measured pressure change and the standard pressure change, it is not clear whether the difference is caused by the</u>

mass flow control valve 22 or the pressure regulator 16, and further it is not clear whether the difference is caused by inaccuracy in the mechanical operation of the mass flow control valve 22 or difference in the flow signal S1 of the mass flow detection means of the mass flow control valve 22. This is real problem." (Remarks, p. 12). In response, Ollivier's pressure regulator does not regulate upstream pressure at pressure sensor 6. If it did, there would be no need for pressure sensor 6. Moreover, the claim does not require "the pressure detecting means is capable of detecting the pressure of the fluid coming in and out of the tank main unit 50 while the fluid is only defined by the aperture opening of the flow control valve 20", as asserted at p. 12 of the Remarks,

14. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM MCCALISTER whose telephone number is (571)270-1869. The examiner can normally be reached on Monday through Friday, 9-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/WILLIAM MCCALISTER/
Examiner, Art Unit 3753

6/8/2010

/Robin O. Evans/
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